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50 years old from the germination of the spore to the time of its collection.

It is not possible by this means to determine the exact age of the plant but there are two important as well as interesting points involved.

1. There is sufficient data to warrant the conclusion that the plant has lived quite a long time.

2. A plant which takes such precaution to retain its old leaves must certainly derive some benefit from them and it is not improbable that these dead leaves in the process of decay and under the influence of the warmth of the summer sun yield something that is of vital importance to the plant in its subsequent growth.

Commenting upon this note Dr. Jennings says: "I had not thought of any particular old age characteristics when I took that specimen from its home on the hot (on *that* day) dry cliff at the top of the talus slope. Now that I think of it I am sure that there could have been collected at that place others which would have shown almost twice as big a bunch of leaves. Whether these would really have been older or not I do not know. Perhaps they might have borne more leaves each year or have retained the old leaves longer but I am sure there were much larger bunches."

STATE NORMAL SCHOOL, KENT, O.

Where *Ophioglossum* grows. (A Multiple Report.)

As a result of my query about the habitat of *Ophioglossum* in the last number of the FERN JOURNAL for 1914, many interesting reports have come in and I am printing them just as received. In connection with these I am printing also the comment of D. C. Eaton in his "Ferns of North America" on the same subject. No matter how thoroughly one may have studied any particular fern of our Eastern states, it is always safe

to turn to Eaton's pages and see what he has to say on the same species. Very often it will be found that he had already recorded facts of which the latter student had believed himself to be the discoverer. His comment on the present subject is as follows:

"Hab.—Commonest in low meadows, but sometimes on dry hillsides." (Page 261.) . . . "The height varies from two to three inches on dry hillsides to over a foot on damp grassy meadows." (Page 262.)

In connection with my call for information, I find I made a considerable mistake in quoting a correspondent as having written that *Ophioglossum* grows in pine barrens in New Jersey. "It is distinctly," I am quoting exactly now, "a plant of the middle district and the coast, very different life-areas from the pine-barrens."

Besides his statement of the localities where he has found *Ophioglossum* himself, Mr. Weatherby has an interesting suggestion to offer as partial explanation of the fact that this fern is to be found both on dry land and in wet meadows, which I print here as introductory to the whole discussion. "May it not be that *Ophioglossum*, like some other species, frequents dry situations in one part, and probably the northern part, of its range, and moist ones in other regions?"

R. C. BENEDICT.

I have two sheets of *Ophioglossum*. One was collected at Barkhamsted, Conn., in moist places in a typical pasture, and I should say where it was shaded by bushes somewhat. The other, South Windsor, Conn., was in an open grassy meadow, near but not in a sphagnous bog in which *Arethusa* and pitcher plant grew. I have also found it in the low moist part of an open meadow in Bloomfield, Conn. In this case it grew near a drainage ditch, in ground which may very likely have been covered with water in early spring.

In the herbarium at Cambridge there are two specimens besides Mr. Knowlton's recorded from dry ground. They are: "Dry thicket, Milo, Me., *M. L. Fernald*," and "Dry field, Colebrook, N. H., *A. S. Pease*." It is perhaps significant that both are from northern New England. There were two or three cases of non-committal data, such as "mowing field" and "sheep pasture," but most of the labels distinctly indicated at least moist ground.

C. A. WEATHERBY.

Regarding *Ophioglossum vulgatum*, I recall finding it in August at New London, N. H., on the south slope of a high steep hill, Brown's Hill, I think was the name—not far north from Pleasant Lake. My recollection is that it was decidedly dry, and that the grass was dead. The slope was so steep that it was difficult for me to keep my feet. I found quite a number of plants in the grass.

EUGENE T. ALLEN.

In my younger days I considered it a very rare fern, at least in this vicinity (Bedford, Mass.). Later I called it "uncommon," now I think "unnoticed" would better describe it.

My first find was Chelmsford, Mass., Sept., 1882, a fertile frond cut off by a scythe. The plant was determined by my old friend, Asa Gray. In August, 1883, in the same locality, fine specimens met Mr. Charles Swan. Now hardly a year passes without my meeting plants of it, generally after the grass has been cut so that the fertile spike is missing.

I find it in what we call "meadows," that is, damp land of natural grass and sedge, and more frequently on

brook than on river meadows. *Orchis virescens* is a frequent neighbor. This is true for the locality of Chelmsford and Bedford, Stowe, Vt., and Hardwick, Mass. I recall but one find on comparatively dry land, on a mowing field near meadow land.

CHARLES W. JENKS.

I have found *Ophioglossum vulgatum* in moist meadows, but much oftener in hillside pastures, in which habitat it is, of course, much easier to discover. I have in mind such a pasture in northern Vermont, which occupies a ridge from which the land slopes on one side with a pitch of not much less than 45 degrees to the river 150 feet or more below. The soil is clay over a slaty shale ledge, and that it is well adapted to moisture-loving plants is shown by the presence of *Liparis Loeselii*, occasional clumps of the *Osmundas*, and all the New England *Botrychiums* except *lanceolata*.

I recently looked through the material in the Herbarium of the New England Botanical Club, noting the various statements of habitat and the number of sheets on which each statement was used with the following result—"Damp meadow," 6; "Low thicket," 3; "Dry field," 3; "Bog," 2; "Dry pasture," 2; and each of the following on one sheet—"Mossy meadow," "Dry thicket," "Gravelly swamp," "Swamp," "Moist pasture." Of course, many labels showed no description of locality.

E. J. WINSLOW.

My experience is that the plant you refer to will grow almost anywhere. It simply is overlooked. I have it from sunny meadows and shady wet nooks where it grows to a huge size.

F. G. FLOYD.

Where have I seen the adder's-tongue fern growing? I looked for it several seasons in damp places and never got a sight of it. Looked where others indicated were likely places.

My first find was on a bank in a pasture, facing northerly not far from the edge of woods. Only a few specimens, but one pair of "twins." No water, no sphagnum near; northwest of Jamesville, N. Y.

While searching for *Botrychiums* in a thicket of prickly ash I ran across my next lot of adder's tongues. Not very thrifty ones, but many of them and a good proportion of them fruiting. The thicket was so dense that I had to crawl through it, and the foliage overhead was one continuous mass, forming a tent-like place beneath. This thicket was on the crest of a rocky ridge between *Scolopendrium* Lake and White Lake, east of Jamesville. A few rods further north I found scattering specimens under sumacs where red raspberries fringed the woods. Not far away, along a wood road, among scattering blackberry bushes, a few more specimens were located. In this station the adder's tongues came up through squawberry vines which closely covered the surface in luxuriant growth. The soil was well drained. Others were noticed on a small hummock, in a small glen, beside a cow path, but partially shaded; sandy loam; no suggestion of wet, sphagnum or muck; about $\frac{1}{4}$ of a mile east of the other stations just mentioned, 100 feet above the lake level. Only one lone specimen has been reported before from this well-known locality.

As thrifty and abundant a lot as I have found was near Labrador Pond, south of Tully, N. Y., on the northwestern side of the pond, as I was climbing up toward the wooded height, through pastured land. Where the grass was deepest, near wild rose bushes, or above woodchuck holes, or on the steeper faces where

cattle avoided it, were very, very many specimens, the largest and best I have collected. This hillside was far too steep to climb with ease, and quite dry.

H. E. RANSIER.

The adder's-tongue fern is interlinked with my early collecting days. I well remember the 14th of August, 1892. Mother wished me to get her some high blackberries in a pasture not far from the house and I went rather reluctantly, as I preferred to go collecting. I returned highly delighted, having found, for the first time, the *Ophioglossum* growing abundantly in a dry hemlock loamy pasture, one-fourth of a mile from the house. It was a red letter day for me; and the previous three seasons I had trod on the plant frequently without being aware of its presence. Indeed, I was expecting to find my first plant in wet bogs: as the Gray's Manuals placed "bogs" first as the habitat for this fern ally.

A note in reference to my localities was published in the Linnaean Fern Bulletin IV: 62. October, 1896; also in the same issue, page 68, I offered 100 specimens of *Ophioglossum* as a Chapter Fern. Some of these specimens fell into the hands of Mrs. Elizabeth G. Britton, who first wrote me in regard to them while I was in college at Ann Arbor. Quoting from her letter of 22 November, 1897, written at New Dorp, Staten Island, she says: "I have received your interesting letter and the fine series of specimens of *Ophioglossums* from your mother. They really are remarkable for the variety of gradations and variations they show in this species, and are particularly valuable to me just now; as I have been puzzled where to draw the line between *O. vulgatum* and the colony of what we have called *O. arenarium* which we found at Holly Beach. I think if you could have seen it you would agree with me, that it was not *O. vulgatum*, and yet there are small forms of that

species which come very close to it. I have written an article for the Bulletin of the Torrey Botanical Club, which I expect to print in December with illustrations."

The following summer I carefully collected a series of specimens for Mrs. Britton; and after my return to the University of Michigan received the following letter (in part) from her: "The packet of *Ophioglossum* is here safely, and I am much obliged. You certainly have found some very interesting intergrading forms, which go far to show that *O. arenarium* is only a starved form of *O. vulgatum*, but my seaside specimens still keep a character of their own which I have not seen matched by any inland forms of *O. vulgatum*. The nearest I have seen were some collected by Mr. A. A. Eaton at Seabrook, N. H., which he showed at the meeting of the Linnaean Fern Chapter in Boston in August."

During the year 1896, I found the adder's-tongue fern in several rather widely separated localities within a radius of three miles of the house; and almost always in old "hummocky" pastures where considerable mouse-ear plantain, *Antennaria*, *Carex pennsylvanica*, and sometimes reindeer moss, *Cladonia*, grew. Once I found it in a cut-over upland meadow. In another locality a few plants were found in a tiny desiccated hollow in a thick woods of beech and sugar maple, in heavy clay soil, and in a sedgy swale, composed largely of *Carex riparia* and *Carex stricta*, surrounded by hard clay soil, near one of our larger creeks, several fine *tall* fruiting plants were found. The 27th of June, 1898, I note that plants growing in dry loamy pastures "vary from a few inches to nearly a foot in height. One or two or even three plants arising from a single root and all fruiting. Particularly more than one plant when the plants are crowded." I do not recall of ever finding the plant but once in a bog where *Sphagnum* grew, the 3 November, 1900, when two small sterile plants were

found in New Michigan Pond marsh in southern West Fort Ann, N. Y. The 15th of June, 1907, *Ophioglossum* was found on the Anaquassacook meadows south of Shushan, N. Y., near the Fly Kill, which empties into the Battenkill river at this point. These meadows are low lying. The 12th of June, 1909, a few plants were found in a tiny wet place north of Round Lake, N. Y., near the creek.

The late Mrs. Lucy A. Millington, the 19 June, 1872, wrote Mr. Wm. H. Leggett, from Glens Falls, N. Y., "*Ophioglossum vulgatum* I find in nearly every swampy bit of grass." There are specimens in the New York State Herbarium at Albany, collected by the late Dr. George D. Hulst on Assembly Point, Lake George, August, 1897, "in damp grassy places." Mr. Wallace Greenalch, of Albany, in 1907 collected *Ophioglossum vulgatum* in a "meadow near Winnie brook on the Baker farm at Schuylerville, N. Y." Mr. Frank S. Pember, of Granville, N. Y., the 21 September, 1908, speaks of this plant as being rather common, but gives no habitat.

During the collecting season of 1913 I failed to bring the plant in, although I very often went where I found it so abundantly in 1892 and 1896. I looked more carefully for it during 1914, but I did not find a dozen dwarfed specimens, for the loamy soil was very dry and parched. Can it be that the successive dry seasons of late years have killed the plants outright; or are the plants somehow carried over these years, resting as the Botrychiums sometimes do? I also visited during 1914 the sedgy swales, and found the plant growing about as abundantly and luxuriantly among the tussocks as it did 18 years ago.

STEWART HENRY BURNHAM.

On May 9, 1914, a cluster of about fifty plants was found three miles west of Bloomington, Ind. These plants were all within an area of four square yards, at the edge of a bush patch on a northwesterly slope near the low and somewhat marshy soil bordering a natural drain. The soil was a stiff clay covered with a very light layer of humus and dead leaves. The plants were from 6 cm. to 10 cm. high, but with the spores not quite mature.

About a week after making the above find, on May 14 to be exact, I was tramping with Prof. D. M. Mot-tier, of Indiana University, over the rough limestone country about 5 miles northwest of Harrodsburg, Ind., when we found another group of *O. vulgatum*. This group showed as many plants as the first, but more closely placed, and somewhat larger than the others. There were no mature spores. This group was on top of a considerable hill, with quite dry soil and a shading of beech and sugar maple. Many of the plants were growing in a path which had recently fallen into disuse.

F. L. PICKETT.

Note upon *Polypodium subtile* and a related species¹

WILLIAM R. MAXON

Polypodium subtile Kunze, described in 1847² from Merida, Colombia, upon specimens collected by Moritz (no. 325), is a diminutive outlying member of the group of *P. cultratum* Willd. which has been rather widely but not frequently collected, the range ascribed to it by Christensen being "Jamaica, Venezuela-Peru." The Jamaican record is erroneous and comes from including

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² *Linnaea* 20: 375.